

This Page Is Inserted by IFW Operations  
and is not a part of the Official Record

## **BEST AVAILABLE IMAGES**

Defective images within this document are accurate representations of the original documents submitted by the applicant.

Defects in the images may include (but are not limited to):

- BLACK BORDERS
- TEXT CUT OFF AT TOP, BOTTOM OR SIDES
- FADED TEXT
- ILLEGIBLE TEXT
- SKEWED/SLANTED IMAGES
- COLORED PHOTOS
- BLACK OR VERY BLACK AND WHITE DARK PHOTOS
- GRAY SCALE DOCUMENTS

**IMAGES ARE BEST AVAILABLE COPY.**

**As rescanning documents *will not* correct images,  
please do not report the images to the  
Image Problem Mailbox.**



# (12) UK Patent Application (19) GB (11) 2 256 880<sup>(13)</sup> A

(43) Date of A publication 23.12.1992

(21) Application No 9121134.2

(22) Date of filing 04.10.1991

(30) Priority data

(31) 912092

(32) 18.06.1991

(33) IE

(71) Applicant

**Thermal Profiles and Accessories Limited**

**(Incorporated in Ireland)**

**100 Drumcondra Road, Dublin 9, Ireland**

(72) Inventor

**Frederick Trenaman**

(74) Agent and/or Address for Service

**Boult Wade & Tennant**

**27 Fumival Street, London, EC4A 1PQ,  
United Kingdom**

(51) INT CL<sup>5</sup>

E04H 1/02

(52) UK CL (Edition K)

E1D DDJ2 DDV2 DGS D2019 D2055 D2063 D2103  
D405 D501 D532

(56) Documents cited

GB 2241275 A

GB 2223772 A

GB 2218127 A

GB 2212183 A

GB 2135707 A

GB 1215133 A

(58) Field of search

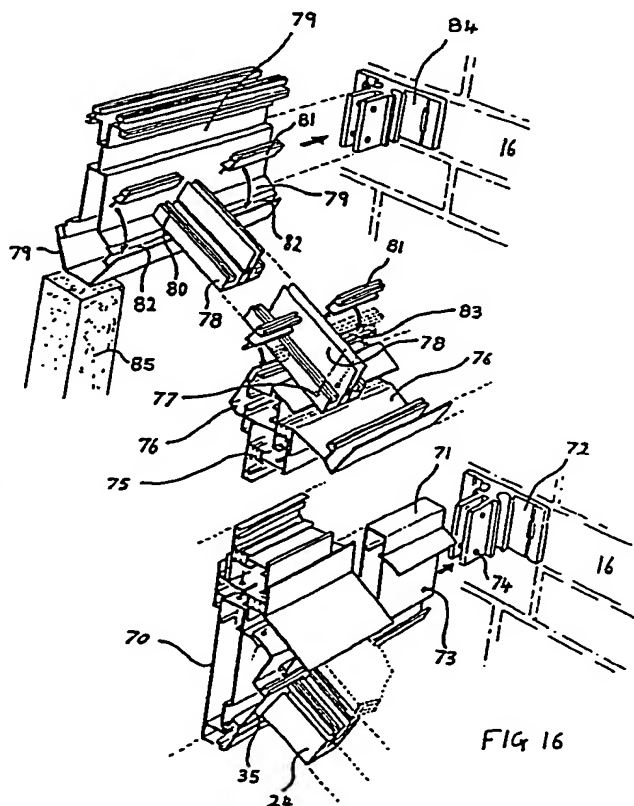
UK CL (Edition J) E1D DGS DLDKM DLFKM

INT CL<sup>5</sup> E04D, E04H

On-line: WPI

## (54) Conservatories

(57) A conservatory has a horizontal composite beam 70 extending all round it and comprising a number of straight beams inclined to one another and connected end-to-end. Glazing units are provided above and below the beam 70, which supports rafters supporting some of the glazing units. In a case where the conservatory has a roof lantern, the beam 70 supports the tops of rafters 24 supporting inclined main roof glazing units below the beam 70, whereas the bottoms of the rafters are supported by a second horizontal composite beam below which are vertical glazing units of a main side wall; also there are vertical glazing units 75, forming a lantern side wall, above the beam 70 and below a third horizontal composite beam 76 which supports lantern roof rafters 78 supporting further glazing units, each of the second and third composite beams extending all round the conservatory and comprising straight beams inclined to one another and connected end-to-end. If there is no roof lantern, and there is a ridge roof or a roof all of which is inclined in the same sense, there is only one such composite beam and the glazing units below it are vertical and those above it are inclined. The ends of the composite beam 70 or composite beams may be secured to a wall 16, in which case the beam or beams will be substantially U-shaped.



GB 2 256 880 A

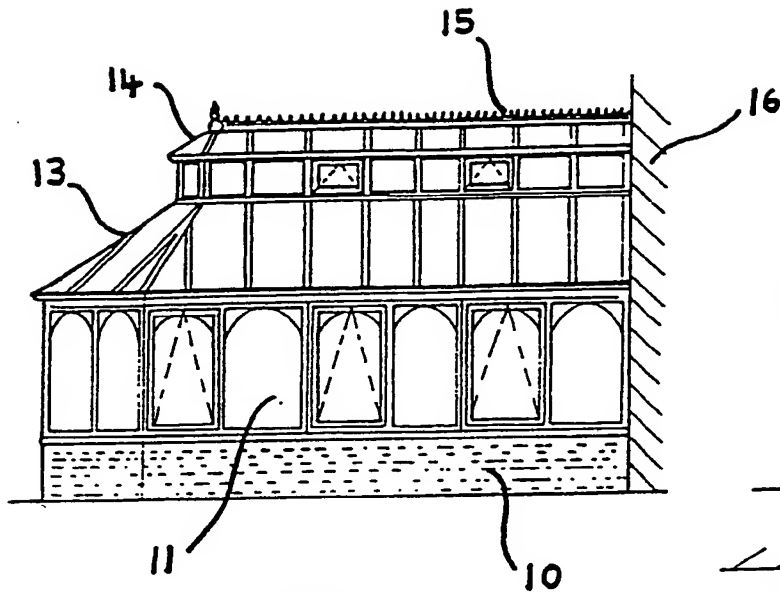


FIG 1

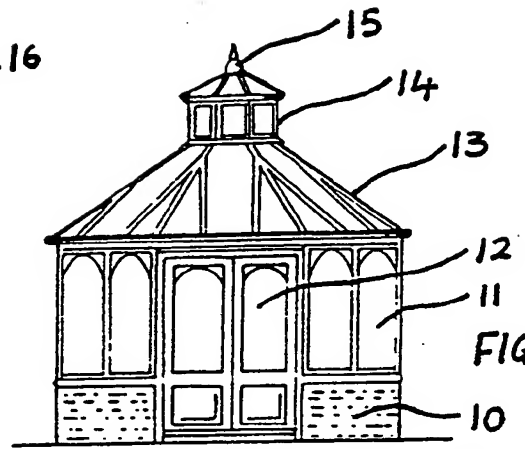


FIG 2

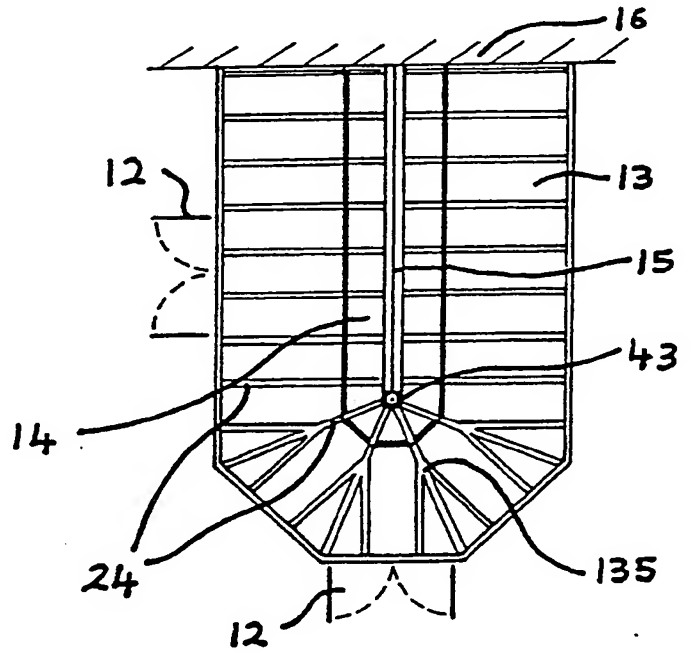
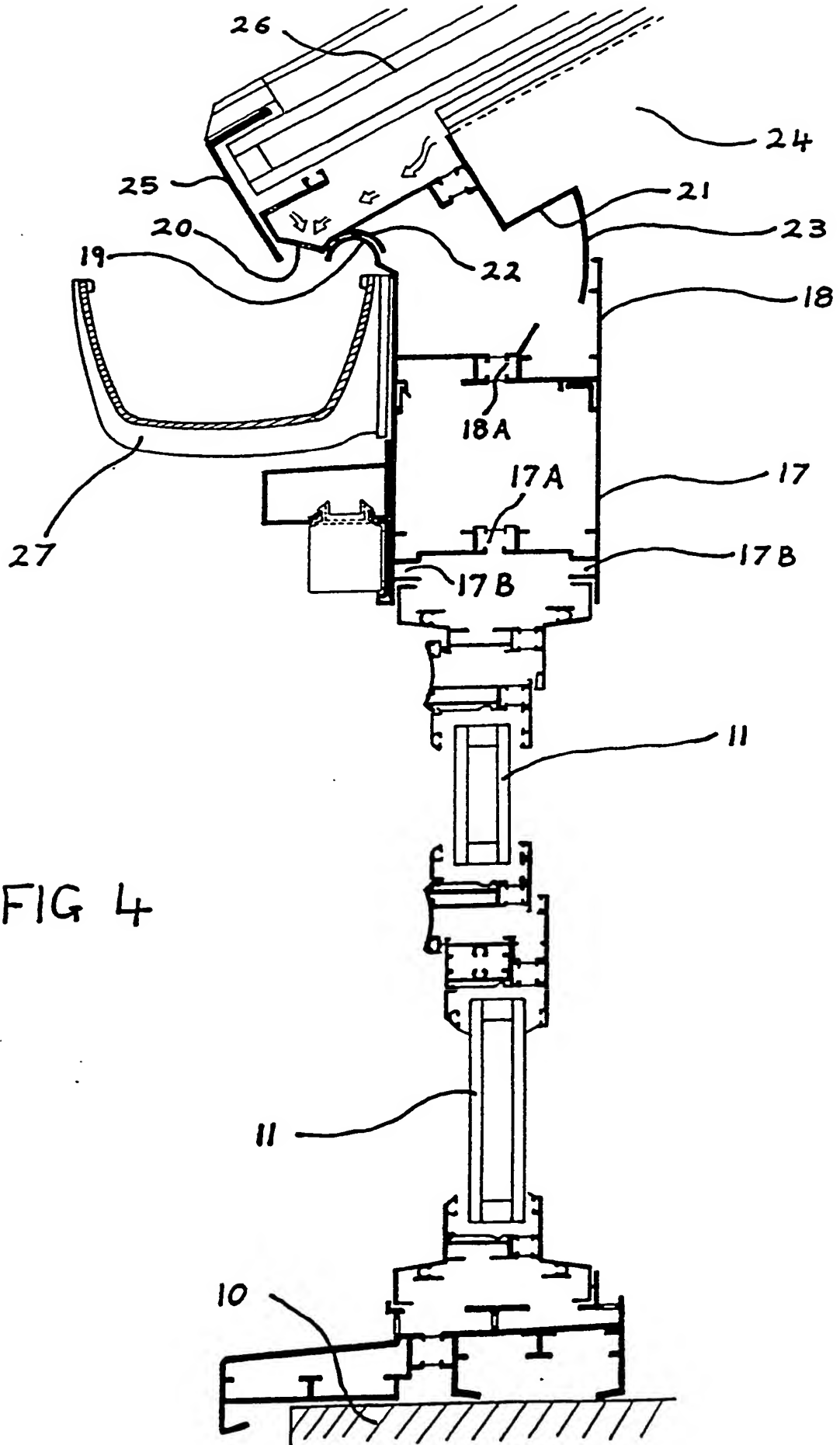


FIG 3



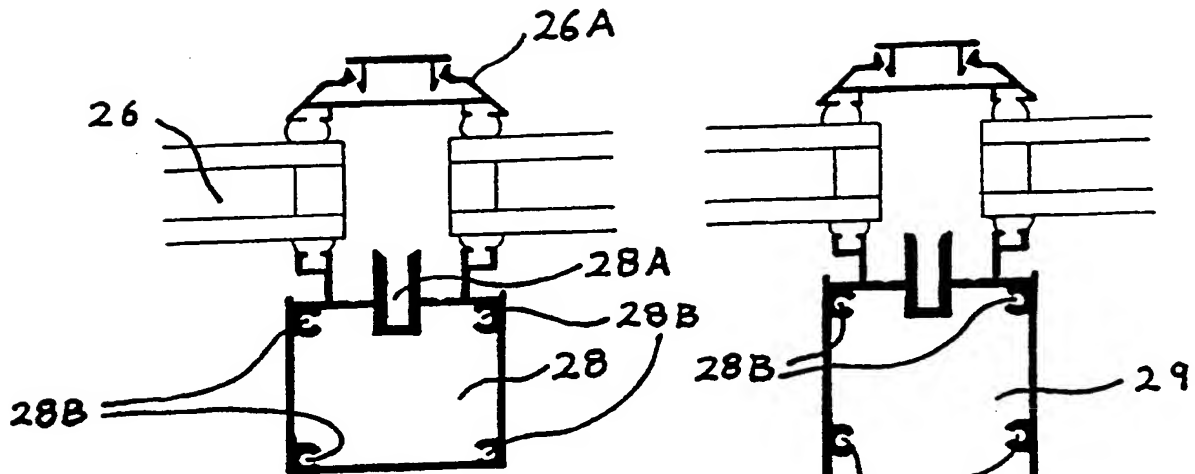


FIG 5

FIG 6

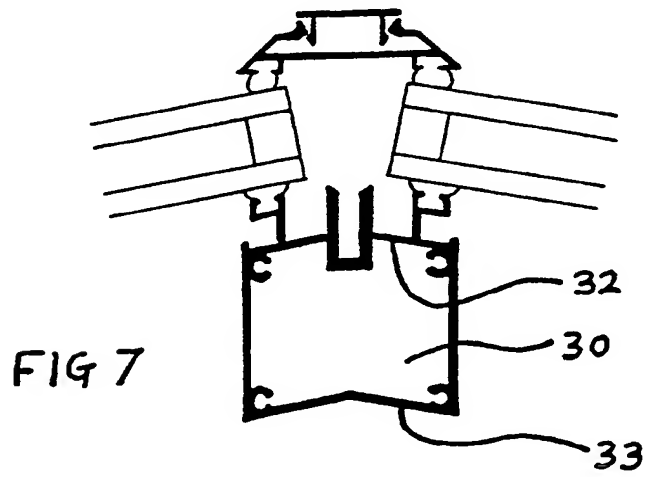


FIG 7

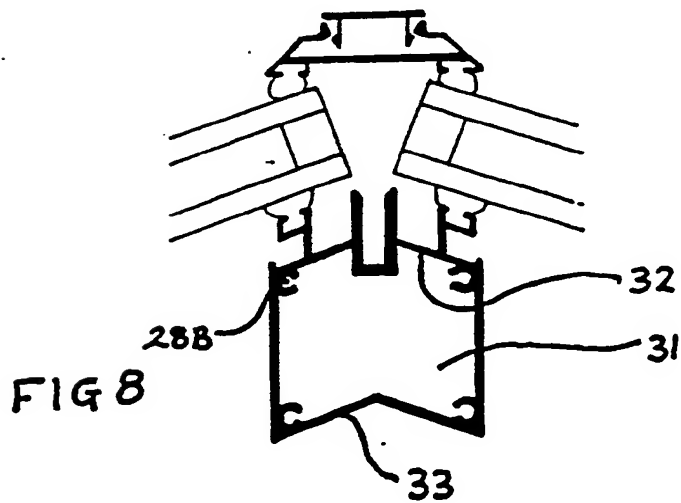


FIG 8

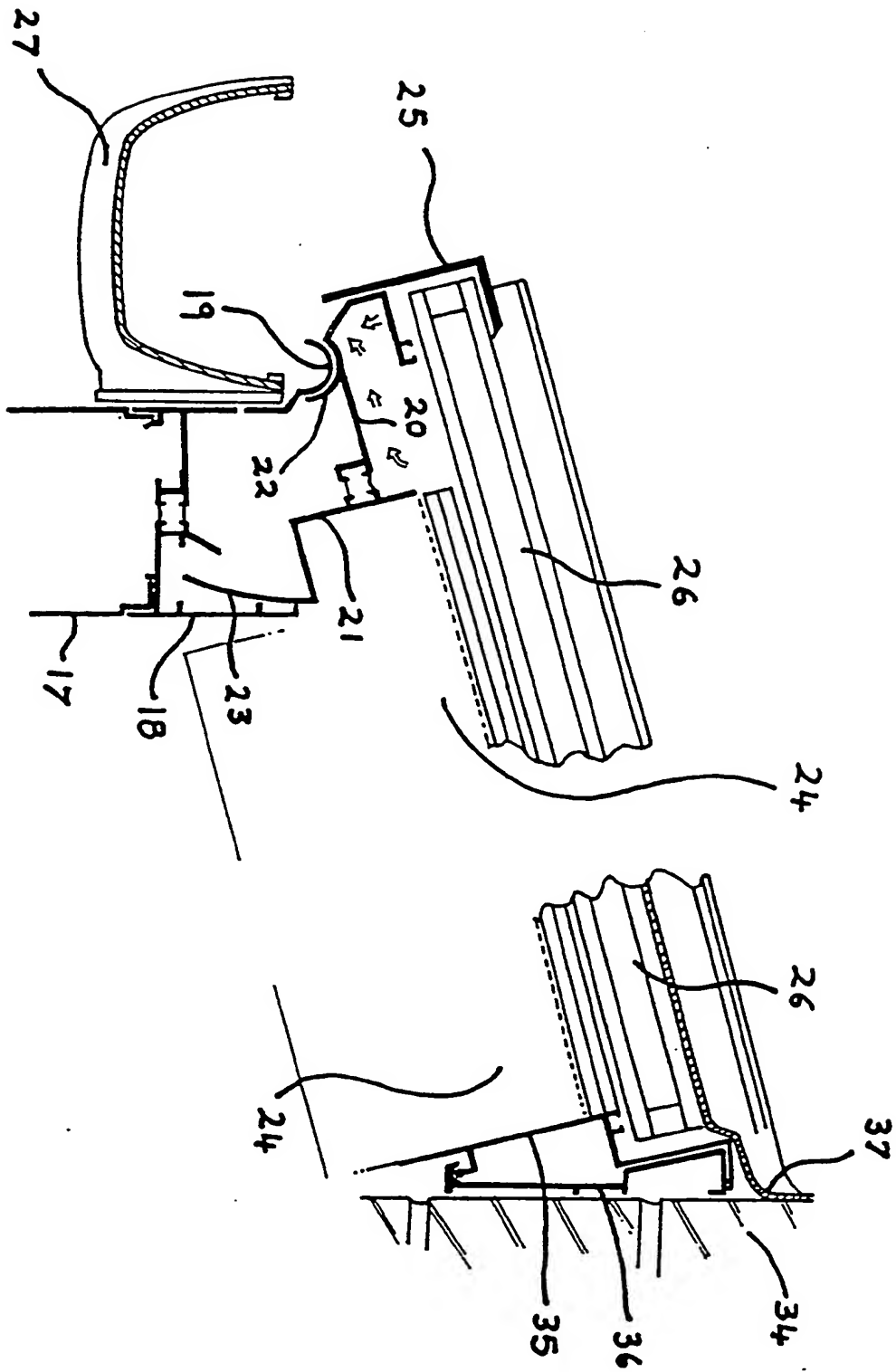


FIG 9

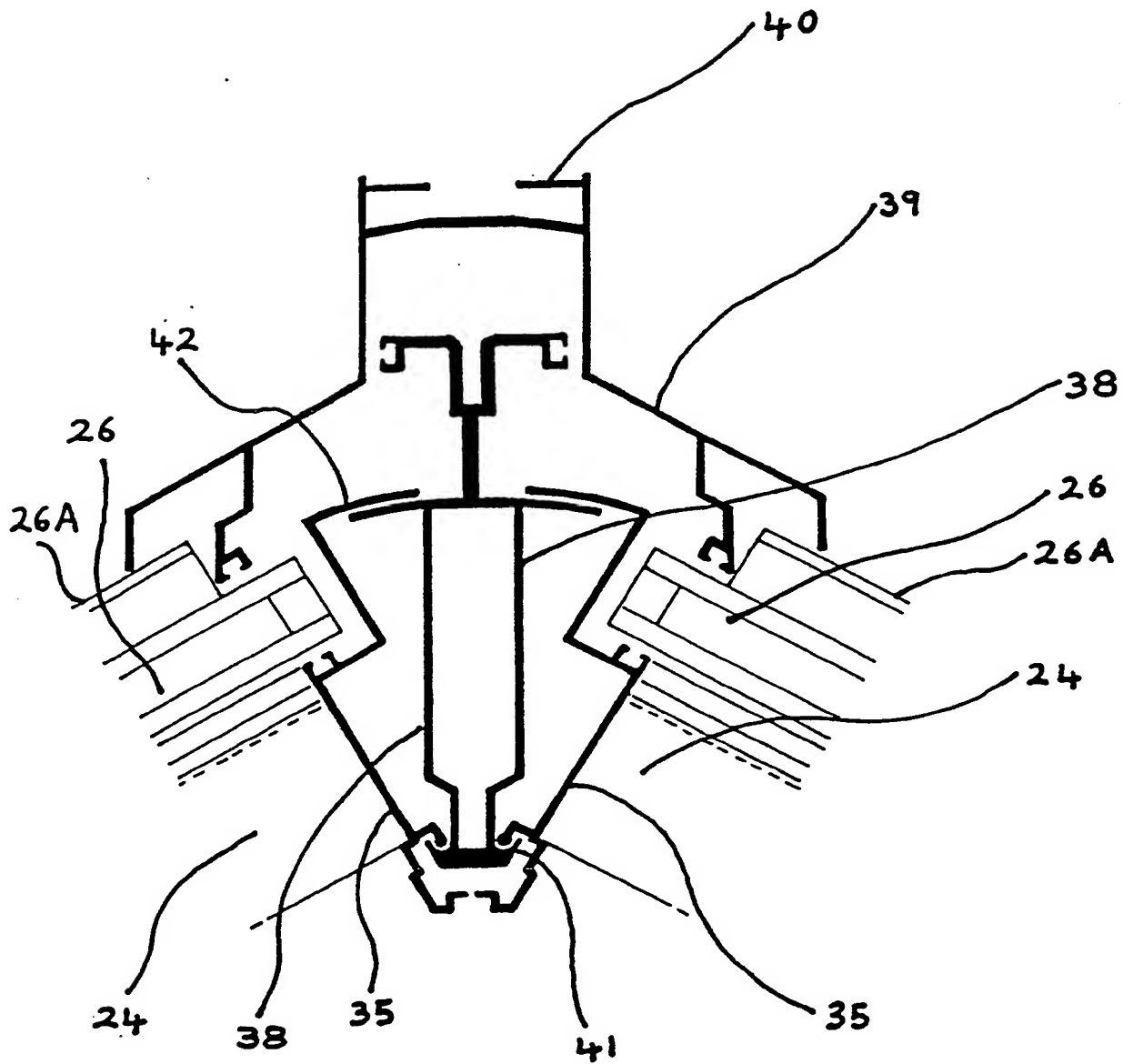
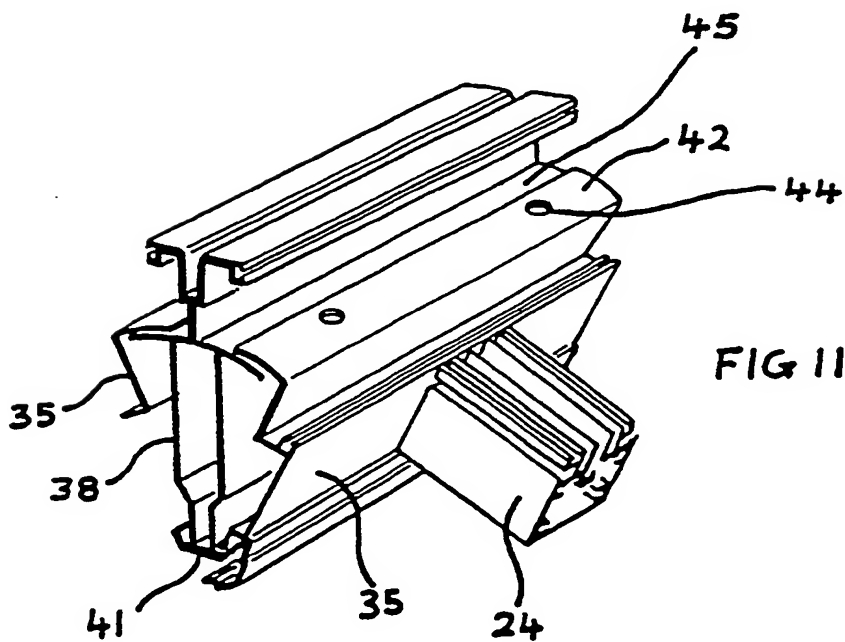
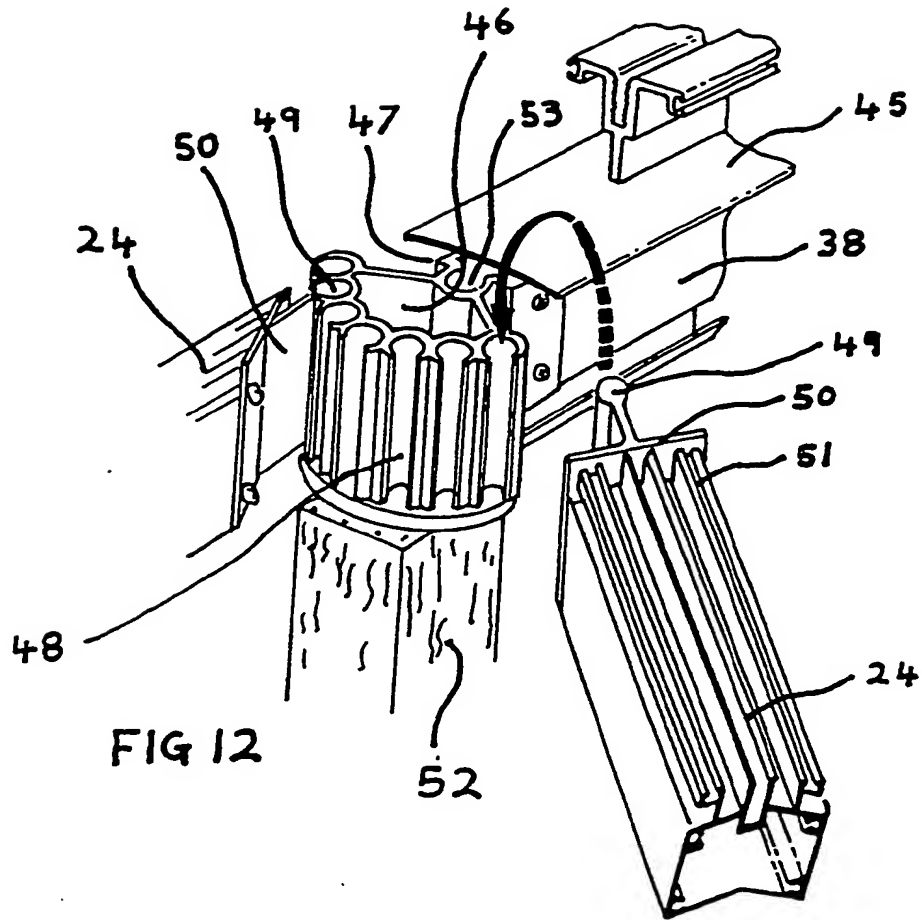


FIG 10





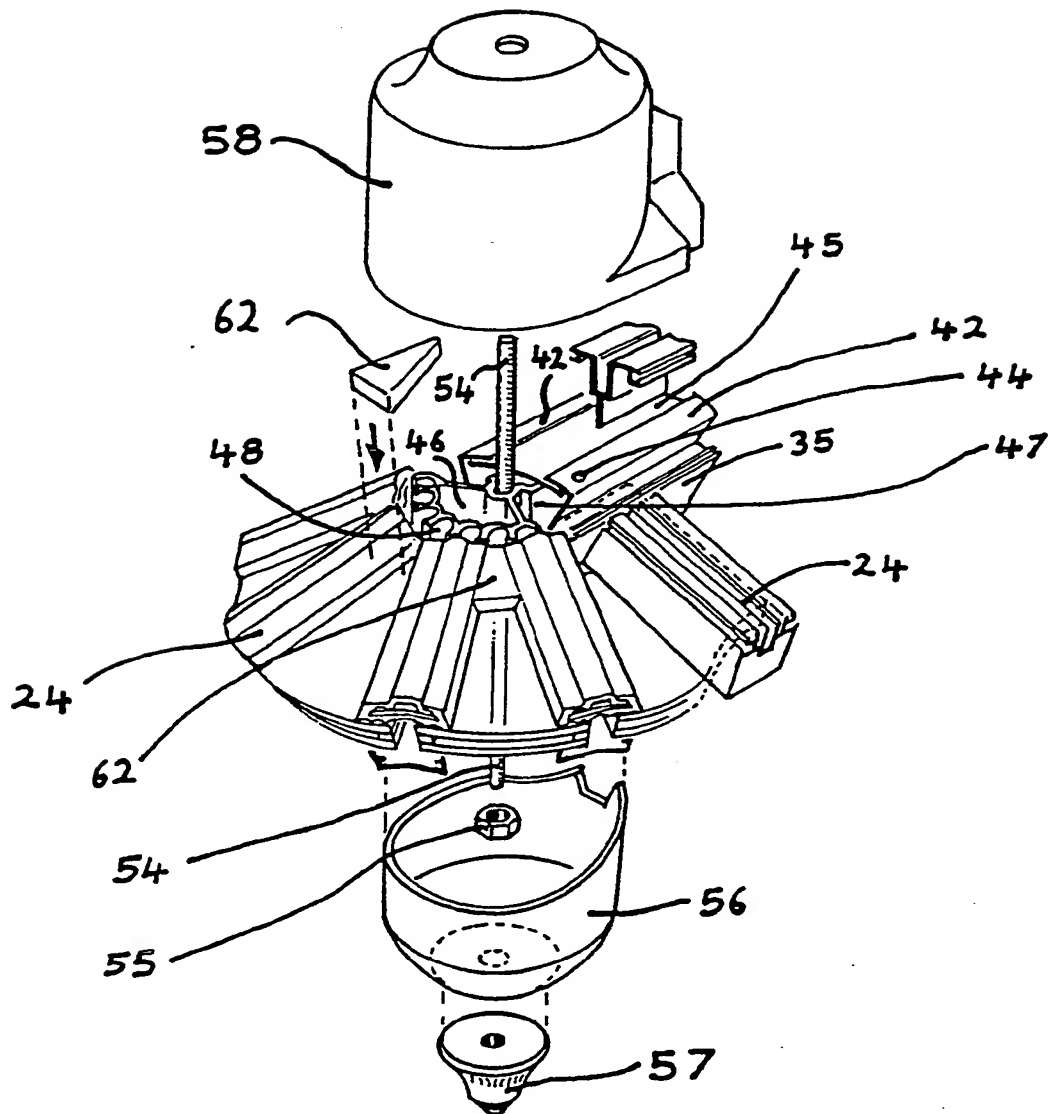
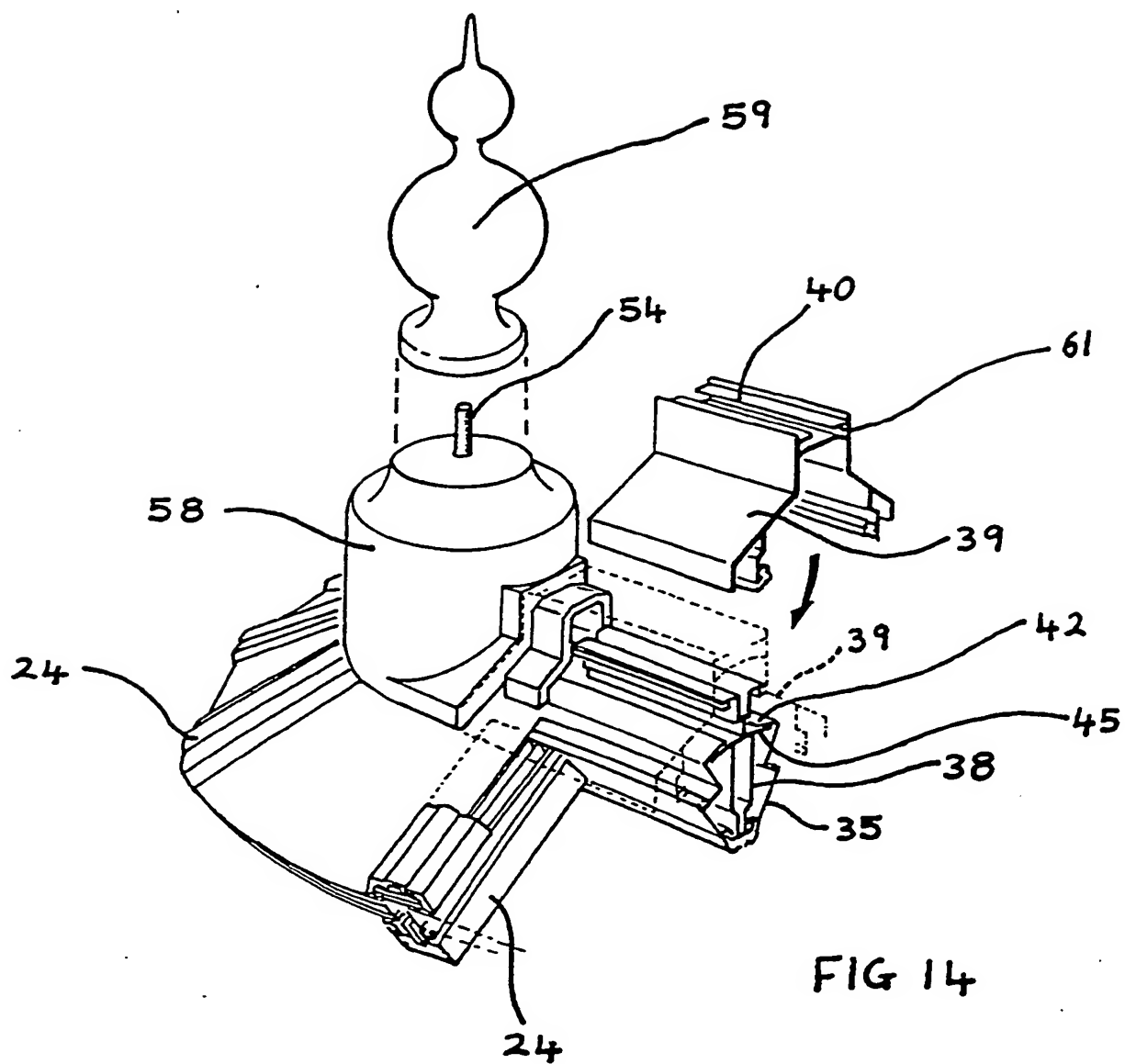
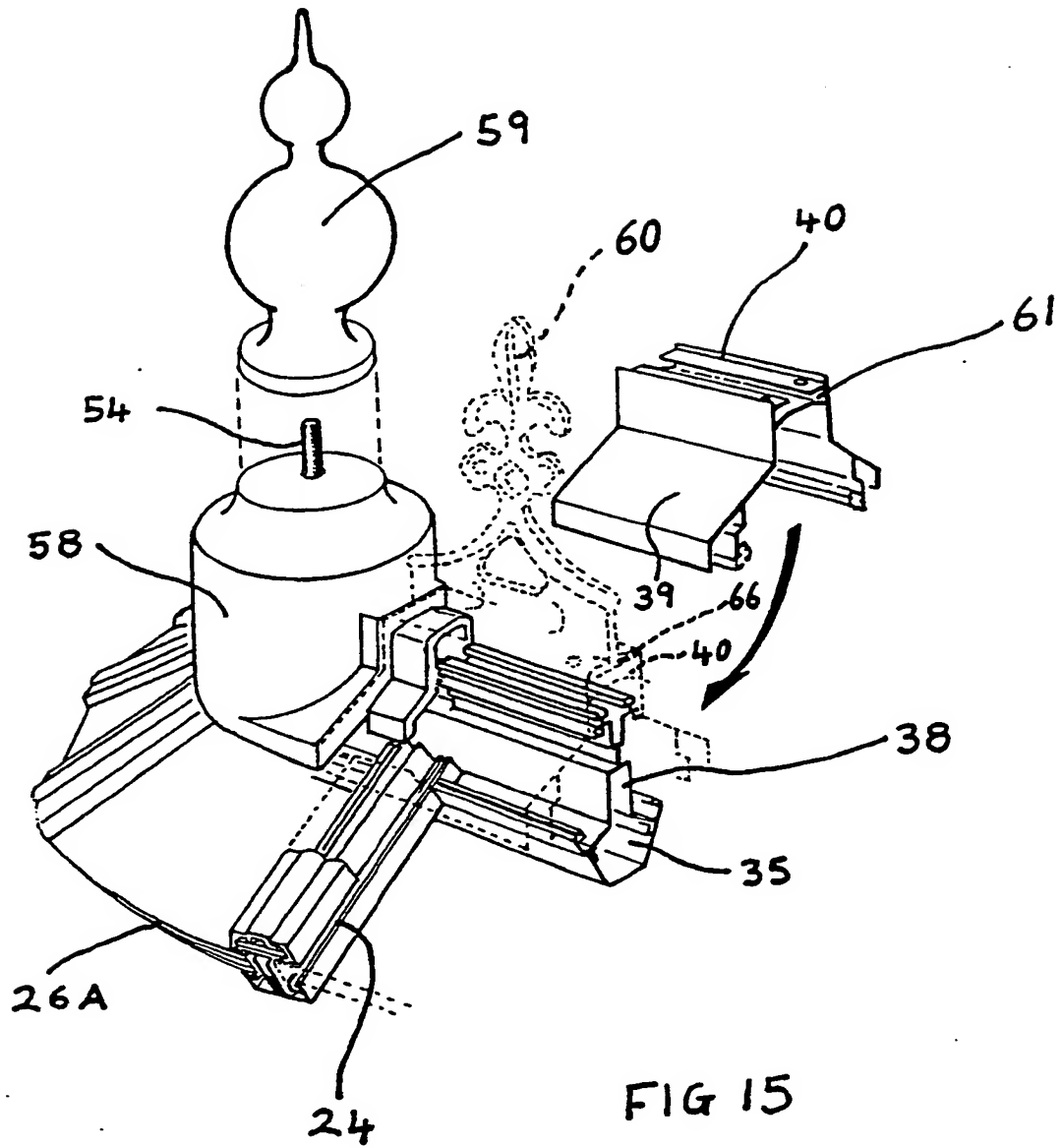


FIG 13





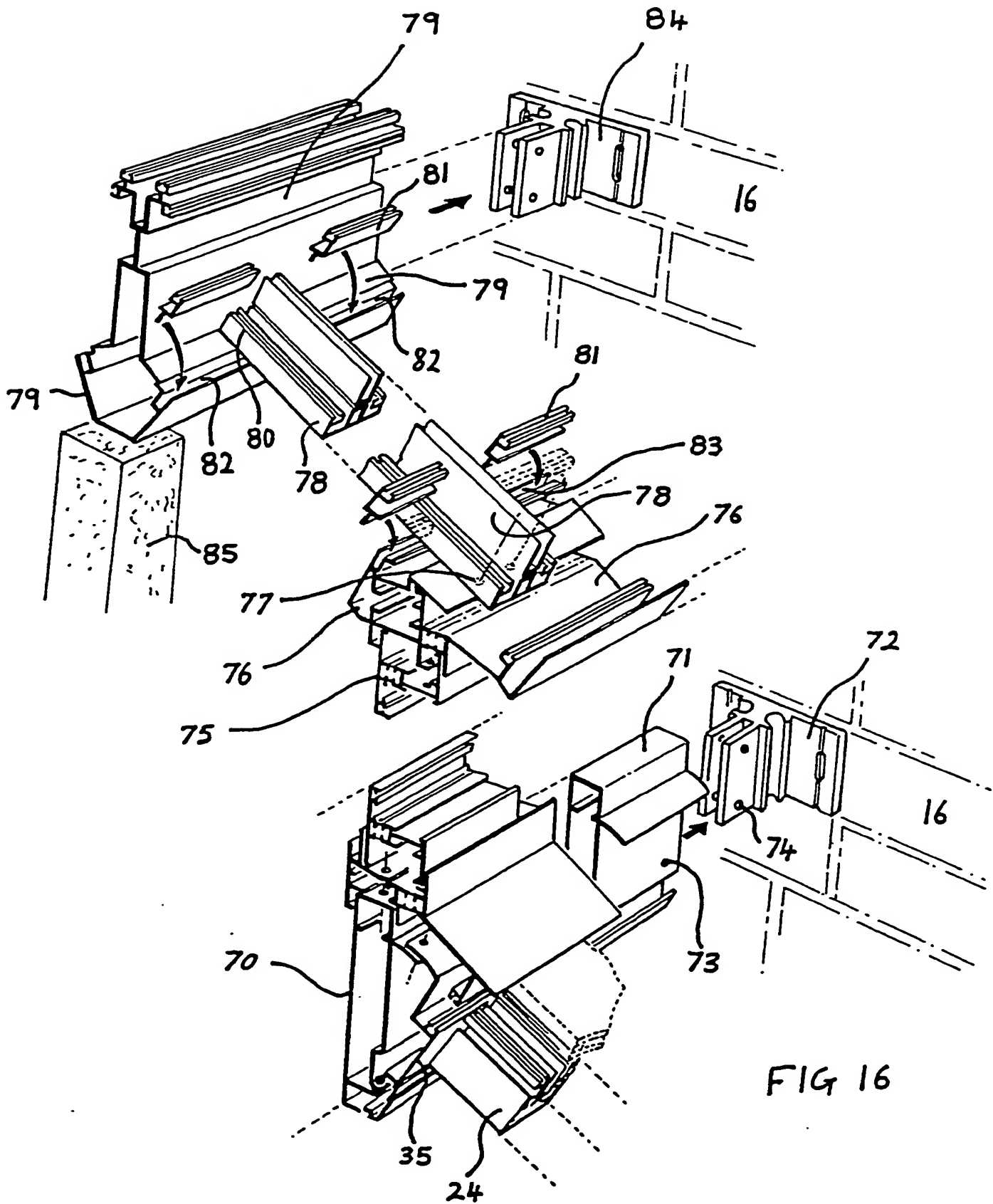


FIG 16

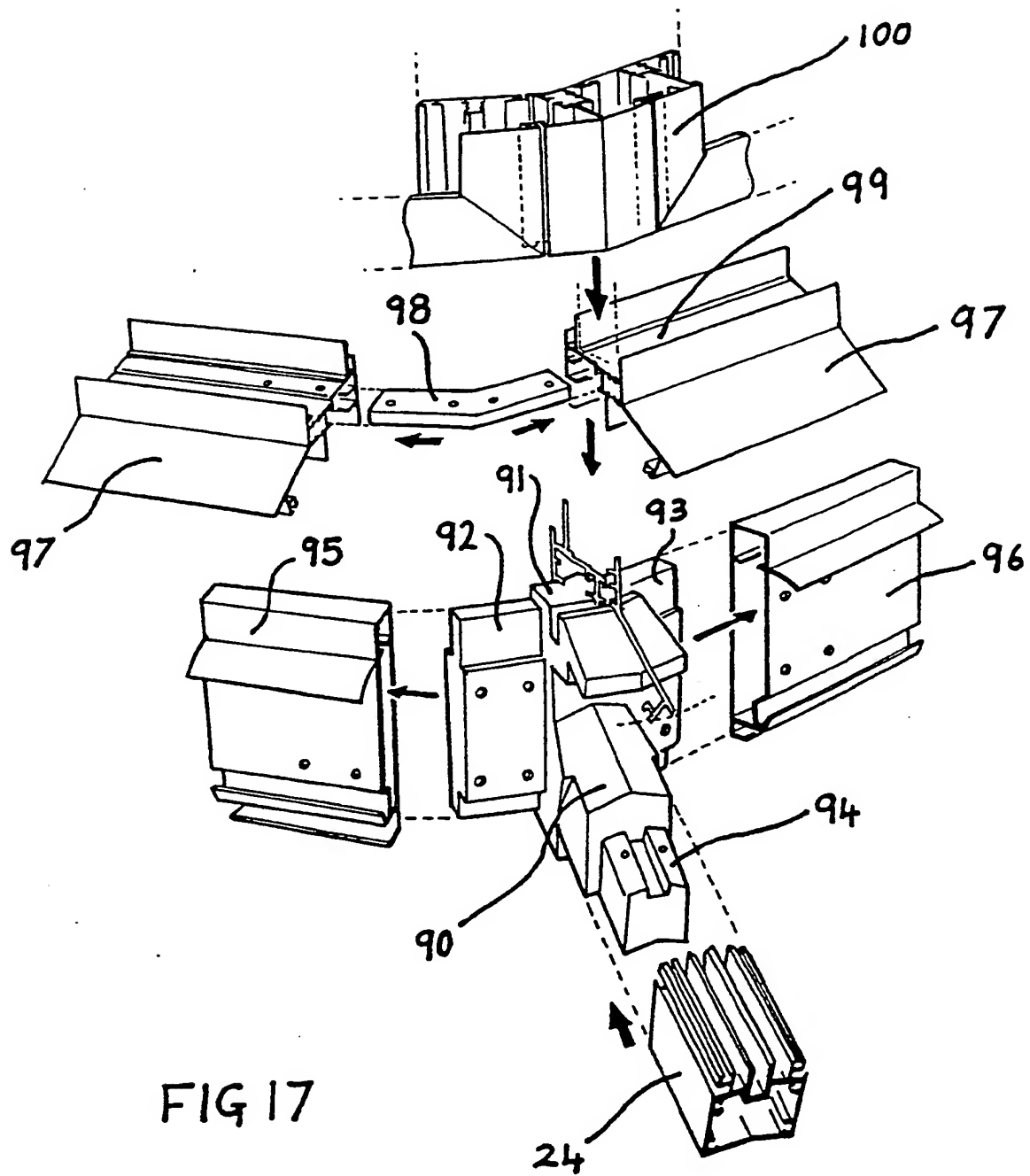


FIG 17

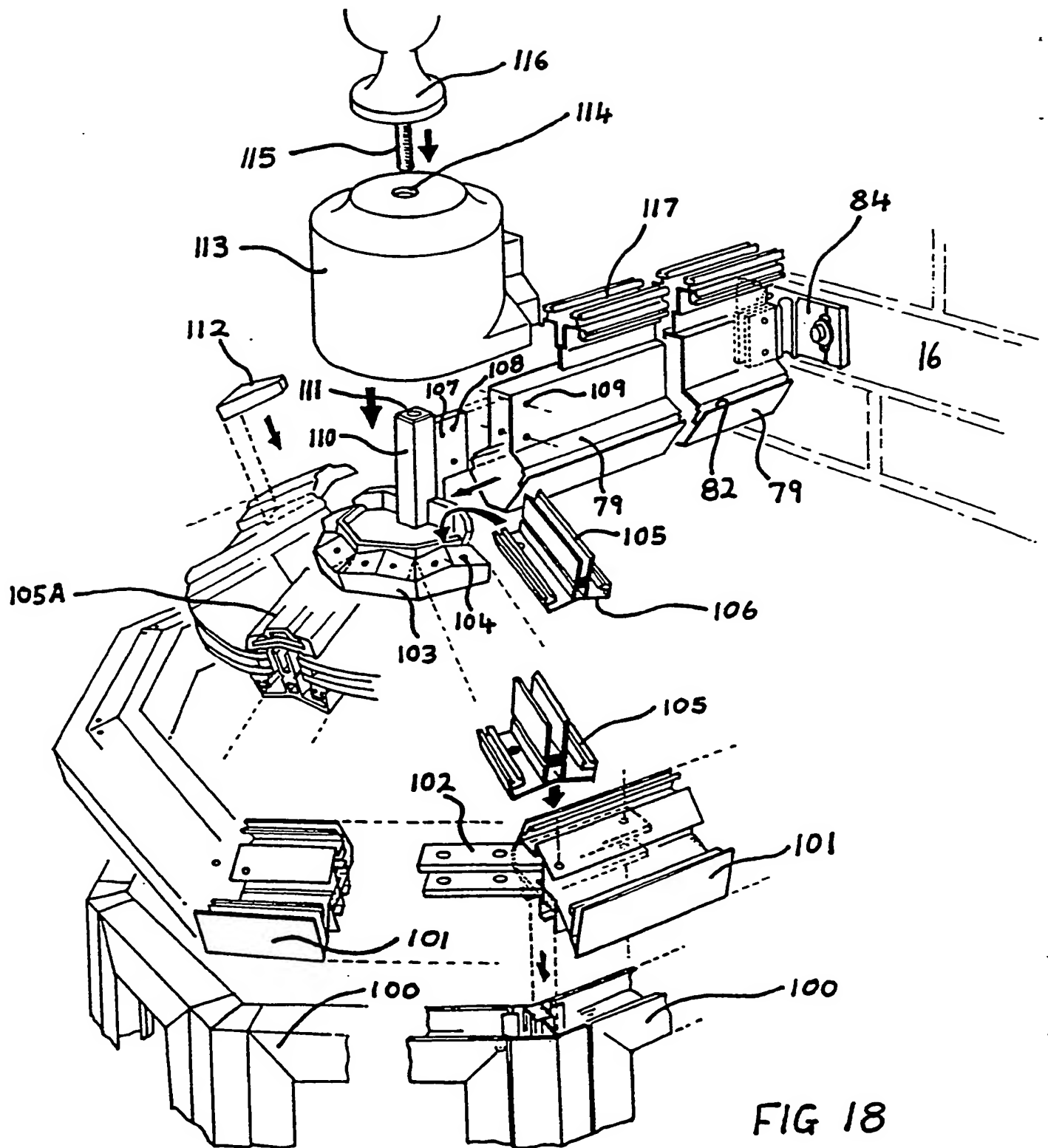


FIG 18

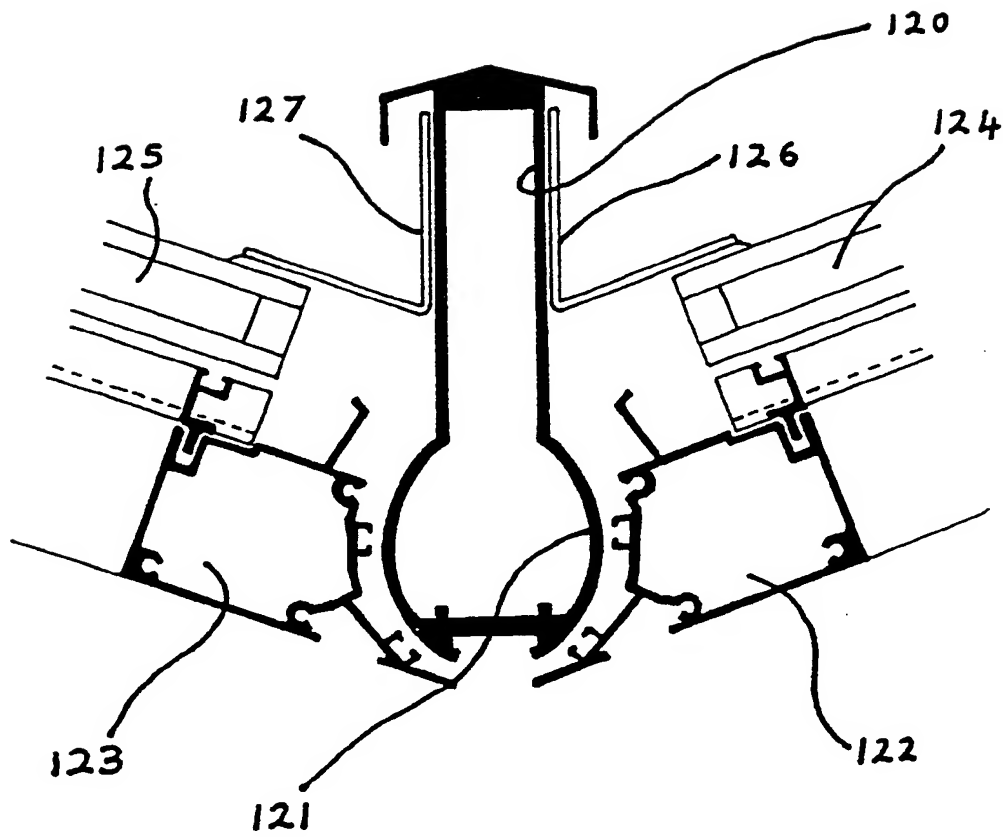
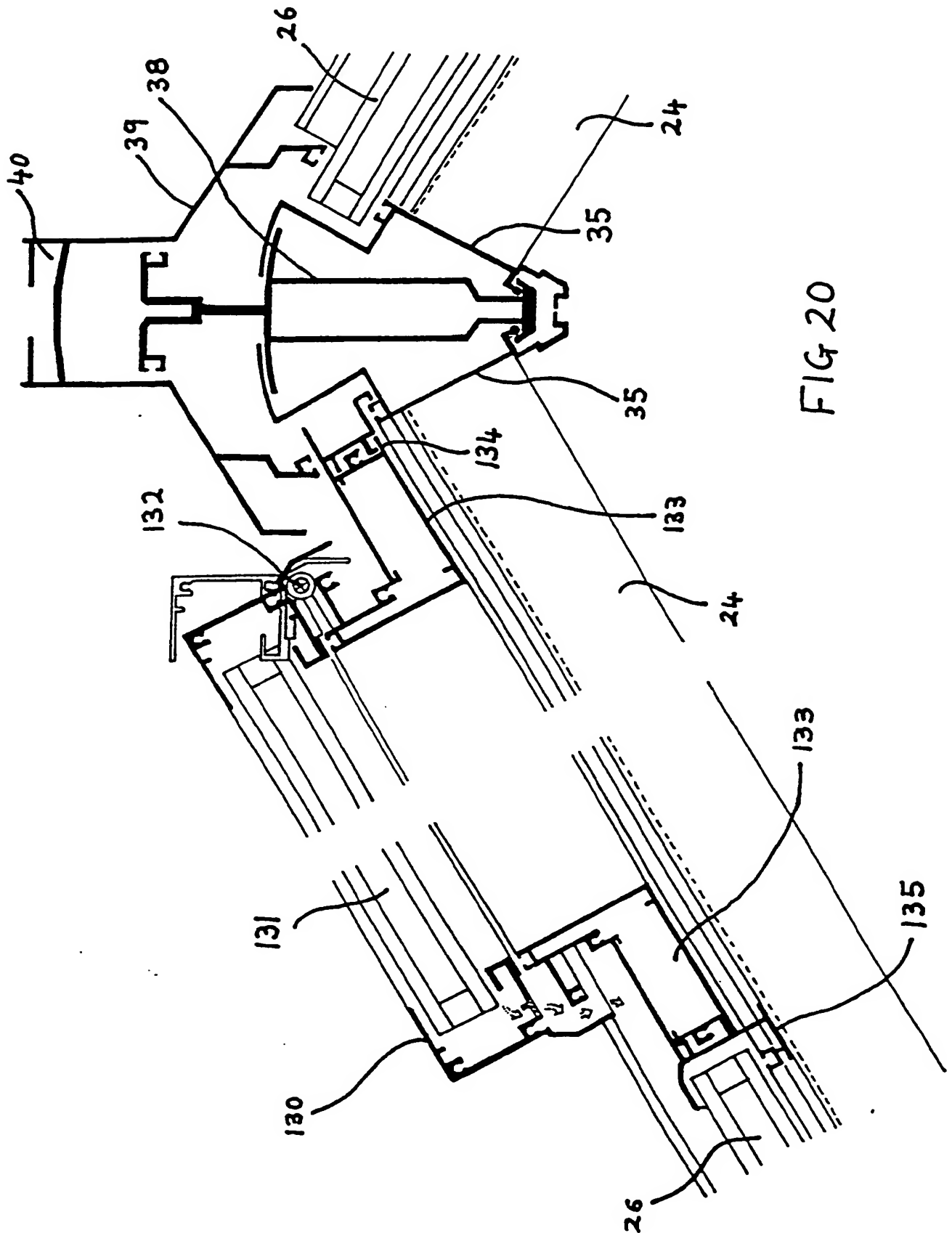
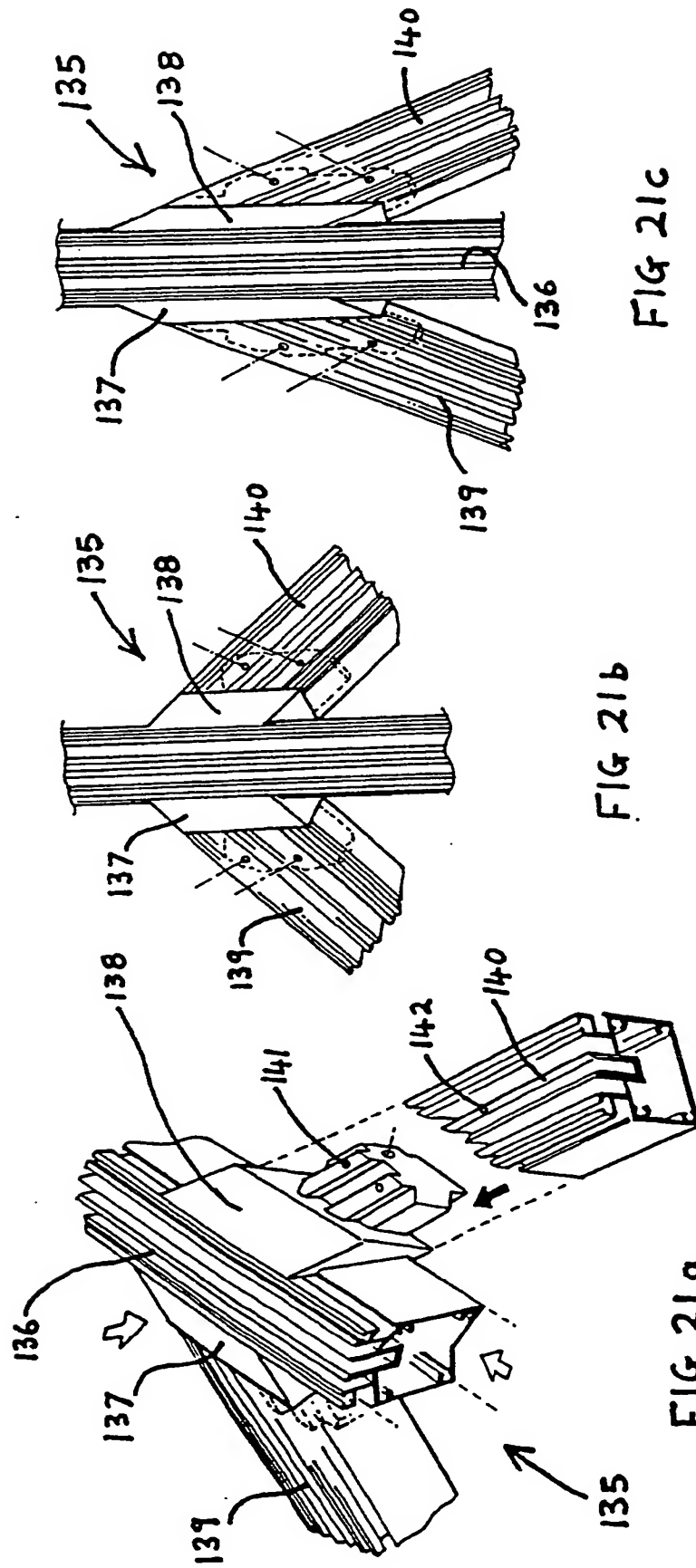


FIG 19







Conservatories

According to the invention, there is provided a conservatory having at least one substantially horizontal composite beam extending all round it and comprising a number of straight beams inclined to one another and connected end-to-end, glazing units being provided above and below each composite beam, each composite beam also supporting rafters which in turn support inclined glazing units.

Examples in accordance with the invention are described below with reference to the accompanying drawings in which:-

Figure 1 shows a side view of a conservatory,

Figure 2 shows a front view of the conservatory of Figure 1,

Figure 3 shows a top plan view of the conservatory of Figure 1,

Figure 4 shows a vertical section through a vertical side wall of a second conservatory,

Figures 5 to 8 illustrate rafters in cross-section,

Figure 9 shows a vertical section through the roof of the second conservatory,

Figure 10 shows a vertical section of the top of the roof of a third conservatory,

Figure 11 shows a perspective view of part of what is shown in Figure 10,

Figure 12 shows a perspective view of another part of the roof of the third conservatory,

Figures 13 to 15 show perspective views of the roof of the third conservatory,

Figure 16 shows an exploded perspective view of a lantern which is part of the first conservatory,

Figure 17 shows an exploded perspective view of part of the bottom of the lantern of Figure 16,

Figure 18 shows an exploded perspective view of part of the top of the lantern of Figure 16,

Figure 19 shows a vertical section through a valley in the roof of a fourth conservatory,

Figure 20 shows a vertical section of a roof light and a roof ridge,

Figure 21a shows a perspective view of a jack rafter connection comprising one long rafter and two shorter rafters and,

5        Figures 21b and 21c show plan views of the jack rafter connection with the shorter rafters at differing inclinations to the long rafter.

Referring to Figures 1, 2 and 3 the conservatory includes a foundation wall 10, upon which are mounted vertical glazed wall  
10        units 11, glazed doors 12 and an inclined glazed roof 13 mounted on top of the wall units 11 and above the door 12, the roof 13 having mounted thereon a glazed lantern unit 14 with a decorative finial 15. The conservatory is fixedly secured to a side wall 16 of a building.

15        The glazed side wall units 11 are of conventional construction formed from aluminium extrusions and standard double glazed units. The wall units are mounted in conventional manner on the foundation wall 10. Figure 4 shows a conservatory in which, in contrast to the conservatory of Figure 1, there is a  
20        lower row of wall units 11 and an upper row of wall units 11 in each side wall. Above the upper row there is an eave beam consisting of an eave beam base 17, which is a channel member open at the top and secured to the tops of the upper glazed side wall units 11 by screws which engage mullions (not shown), and an eave  
25        beam top 18 which fits over the top of the eave beam base and is fixed to it by screws. The eave beam base 17 and top 18 are each formed in two parts and these are coupled together by coupling members 17A and 18A, respectively, having grooves into which  
30        flanges of the parts 17 and 18, respectively, project. The eave beam top 18 has an arcuate portion 19 which co-operates with an arcuate portion 22 of an adjustable rafter support member consisting of two parts 20 and 21 coupled together by a coupling member 20A, the part 21 having an arcuate portion 23 which  
35        co-operates with flanges inside the eave beam top 18. This and the portions 19 and 22 facilitate adjustment of the rafter support member relative to the eave beam top 18 to allow extruded hollow rafters 24 to be supported at selected inclinations.

A number of straight eave beam bases 17 are connected together end-to-end, to form a substantially U-shaped continuous beam base corresponding in shape to the outline of Figure 3, by coupling members (not shown but like connectors 98 of Figure 17) inserted into the ends of sockets 17B (Figure 4) in individual beam bases 17. The ends of the beam base are secured by screws to a substantially U-shaped bracket (not shown) the base of which is secured by screws to the wall 16. Then the beam tops 18 are fitted on the beam bases 17 to form a composite eave beam.

The rafter support member 20, 21 has associated with it a glazing unit support 25 to locate and support the lower ends of roof glazing units 26. Foam PVC tape (not shown) separates the support 25 from the glazing units 26. A gutter 27 is secured by screws to the eave beam top 18. Water flows into it not only from the tops of the roof glazing units 26 but also from drainage holes in the part 20, as shown by the arrows.

The rafter 24 may, as shown in Figure 5, be a rafter 28 of square cross-section, or, as shown in Figure 6, a rafter 29 of rectangular cross-section - a rafter suitable for use in the construction of a lean-to conservatory where a 15 ft span is required - or, as shown in Figure 7 or Figure 8, a rafter 30 or 31, these latter rafters being suitable for use as hip rafters for use in a three-bay segment as shown in Figure 3. The hip rafters 30 and 31 are characterised in that the upper and lower sides 32 and 33 are in the form of inverted Vs having regard to the bay angle, i.e. the hip rafters 31 and 32 illustrated in Figures 7 and 8 are suitable for use with a 135° and 90° bay segment angle, respectively. A pressure plate 26A houses the heads of screws (not shown) which are screwed into a groove 28A in the top of the rafter 24, 28, 29, 30 or 31.

In Figure 9, which shows a lean-to conservatory the roof is illustrated with a smaller angle of inclination than is shown in Figure 4. The roof glazing units 26 span the distance from the top of the wall units 11 to a wall 34. The top ends of the roof glazing units 26 and the rafters 24 are located and secured in wing beams 35 mounted on wall brackets 36 secured to the wall 34. A sealing strip 37 is provided for weathering purposes.

Figure 10 illustrates a roof ridge construction, the roof glazing units 26 and the rafters 24 again being located and supported in wing beams 35. These are located each side of and fixed by screws to a ridge beam 38, it being possible to select the inclination of each side of the roof. This is achieved by providing each wing beam 35 with a pivotal mounting 41 on the ridge beam 38 and providing an arcuate arm 42 on each wing beam 35. The ridge beam 38 is provided with a cover member 39 having a ridge cresting 40. The cover member 39 not only shields the ridge beam 38 but acts to cover off and seal the top ends of the roof glazing units 26 and the rafters 24.

Figure 11 shows a rafter 24 supported on a wing beam 35 and shows holes 44 in the wing beam through which pass screws for securing an arcuate arm 42 of the wing beam 35 to a complementary arm 45 of the ridge beam 38. This is done after the required number of rafters 24 have been secured to the outer face of the wing beam 35, in each case by four screws which have their heads on the inner face of the wing beam 35 and their shanks in sockets 28B (Figure 4) in the rafters.

A conservatory with a three-bay segment as shown in Figure 3, but without the lantern unit 14, has rafters 24 converging at point 43. In order to support the upper ends of the rafters there is provided a ridge casting 46 shown in Figure 12, which has a shank 47 which is fixed by screws to the ridge beam 38, the shank 47 carrying integral rafter locators 48 arranged in a part-circle. The locators are channels of substantially C-shaped cross-section and each of them houses a bead 49 integral with a plate 50 secured to the top end 51 of each rafter 24.

When the roof is in the process of construction it is necessary to support the ridge casting 46 in its position attached to the ridge beam 38 by means of a wooden prop 52. Once the rafters 24 are connected to the ridge casting 46 the prop 52 may be removed.

The ridge casting 46 is provided with a socket 53 which can accommodate a threaded bolt 54 (Figure 13) held in position on the ridge casting 46 by a lock nut 55 below the ridge casting and another lock nut (not shown) above the ridge casting. On the bolt

54 may be mounted an internal finial casting 56 held in position by a decorative nut 57 and a finial base casting 58 which sits over the ridge casting 46 and is held in position also by a decorative nut 59 (Figure 14). In order to finish off the roof one may use a decorative ridging 60 (Figure 15) which has a base 66 which lies in a socket 61 of the ridge cresting 40 of the cover member 39. Alternatively, a sealing strip may be pressed into the mouth of the socket. Wedge-shaped separators 62 are provided between the converging rafters 24.

10 To prevent horizontal forces destabilizing the roof structure long tie rods spaced about 8 ft. apart extend across the conservatory near the lower ends of the roof glazing units 26 and shorter tie rods extend across the bottom of the lantern if such is provided, in which case the longer tie rods may be connected to the shorter tie rods by vertical struts.

15 Figure 16 shows the top end of one of several inclined rafters 24 connected as before to a wing beam 35 which is connected to a lantern base beam 70 which consists of several straight beams joined, by inserts in their ends, to form a continuous substantially U-shaped composite beam. The beam 70 is 20 secured at each free end 71 to a bracket 72 which is fastened by screws to the wall 16 and screws passed through aligned holes 73 in the beam 70 and 74 in the bracket 72.

25 The top of the beam 70 engages with the bottoms of conventional glazed units, the tops 75 of the glazed units engaging with a substantially U-shaped lantern eave beam 76 which again consists of straight beams joined together by coupling members inserted in their ends and by screws. The lantern eave beam 76 has secured thereto by screws 77 the bottom ends of 30 lantern rafters 78, the top ends of which are connected by screws 80 to a lantern ridge beam 79. Separate glazing support members 81 are used in this instance to allow one to connect the lantern rafters 78 directly on to the lantern eave beam 76 and the lantern ridge beam 79, the support members 81 being located by force fit 35 into grooves 82 and 83 in the ridge beam 79 and eave beam 76, respectively. The ridge beam 79 is secured to the wall 16 in the same manner as the lantern base beam 70, using a bracket 84 and

screws. The lantern ridge beam 79 must be supported during assembly and a wooden prop 85 is used for this.

In order to form the matching bay segment of the lantern it is necessary to provide hip connectors both at the level of the lantern base beam 70 and at the level of the lantern ridge beam 79. In Figure 17 a lantern base beam hip connector 90 is shown, this being a solid metal casting having a base 91 from which project side portions 92 and 93, which project into sections 95 and 96 of the lantern base beam 70, and a portion 94 which projects into a rafter 24.

On top of the lantern base beam 70 is mounted a lantern sill flashing assembly 97 which consists of a plurality of sections held together by connectors 98 and screws through holes 99.

The lantern sill flashing assembly 97 locates and supports the bottoms of glazed lantern wall units 100. As shown in Figure 18, the tops of the wall units 100 engage the sections 101 of the lantern eave beam 70, the sections being secured together by connectors 102 and screws. The converging lantern rafters 105 are connected by screws at their lower ends to the beam sections 101, while the top ends are fastened by screws to a lantern hip ridge connector 103 provided with inclined bearing surfaces, with screw holes 104, upon which rest inclined lower surfaces 106 of the rafters 105. The rafters 105 receive pressure plates 105A.

The lantern hip ridge connector 103 includes a pillar 110 from which projects a flange 107 which extends into the lantern ridge beam 79 and is fastened to it using screws in holes 108 and 109. The pillar 110 has a threaded screw hole 111. Wedge-shaped separator members 112 are placed between rafters 105.

A finial base casting 113 is provided with a screw hole 114 through which a screw 115, connected to the base of a finial 116, can pass to enter the screw hole 111.

The top 117 of the lantern ridge beam 79 is grooved to accommodate the flat base of the decorative ridging.

The present invention allows for a plurality of differing roof constructions including lean-to roofs, standard apex roofs, lantern roofs, etc. In some instances the roof provided for a conservatory may demand joining roof units of differing pitch. In



such cases a valley beam as shown in Figure 19 may be used. The valley beam has a sill-protected vertical part 120 with an arcuate base 121. The respective rafter-supporting beams 122 and 123 of the glazed roofs 124 and 125, which can have differing pitches, or angles of inclination, in contrast to what is shown in the drawing, join the valley beam at the base 121 and because the base 121 is arcuate the eave beams 122 and 123 can engage the base 121 at a plurality of differing angles. The roofs 124 and 125 have flashings 126 and 127.

Figure 20 shows a roof light 130 including a glazed unit 131 pivotally connected at 132 to an extruded roof light surround 133 having ends 135 which engage a roof glazing unit 26 and a wing beam 35, respectively.

In the assembly of a three-bay segment of a conservatory roof as shown in Figures 1 to 3, a jack rafter connection 135 as shown in Figures 21a, 21b and 21c may be used, this comprising a long rafter 136 and shorter rafters 139 and 140 fastened together by connector members 137 and 138 and screws through holes 141 and 142.

## Claims

1. A conservatory having at least one substantially horizontal composite beam extending all round it and comprising a number of straight beams inclined to one another and connected end-to-end,  
5 glazing units being provided above and below each composite beam, each composite beam also supporting rafters which in turn support inclined glazing units.
2. A conservatory according to claim 1 in which there is only one such composite beam and it supports the lower ends of the  
10 rafters, the conservatory having a ridged roof including a straight ridge beam which supports the upper ends of the rafters, the glazing units below the composite beam being substantially vertical.
3. A conservatory according to claim 1 having a roof lantern and  
15 three such composite beams, a lower composite beam having substantially vertical glazing units below it and inclined main roof glazing units above it, an upper composite beam having substantially vertical lantern wall glazing units below it and inclined lantern roof glazing units above it and an intermediate  
20 composite beam having the inclined main roof glazing units below it and the lantern wall glazing units above it, the upper composite beam supporting the lower ends of lantern roof rafters and the other two composite beams supporting opposite ends of main roof rafters.
- 25 4. A conservatory according to any preceding claim in which each two adjacent sections of the or each composite beam are connected together by a connecting member having a portion inserted in the end of one section and another portion inserted in the end of the other section and screws fastening said sections to said portions.
- 30 5. A conservatory according to any preceding claim having two opposite and parallel side walls and a bay having at least three wall sections inclined to one another and to said side walls, the bay also having long rafters each having the upper ends of two shorter rafters connected to its sides at a location between its  
35 ends.
6. A conservatory according to claim 3 having two opposite and parallel main side walls and a bay having at least three wall

sections inclined to one another and to said main side walls, the roof lantern also having two opposite and parallel side walls and a bay having at least three wall sections inclined to one another and to said side walls of the lantern.

5 7. A conservatory according to claim 6 in which all the rafters of the lantern bay each have two oppositely inclined lower surfaces which rest on oppositely inclined upper surfaces of a single lantern hip ridge connector and the lantern rafters are secured to the hip ridge connector, the latter having a portion  
10 which projects into one end of a lantern ridge beam.

8. A conservatory according to claim 6 or 7 having at the bottom of each connection between lantern bay wall sections, or between a lantern bay wall section and a lantern side wall, a lantern base beam hip connector having a base from which portions extend into  
15 ends of two adjacent sections of the intermediate composite beam and into the upper end of a main roof rafter.

9. A conservatory according to claim 2 having two opposite and parallel side walls and a bay having at least three wall sections inclined to one another and to said side walls, the upper ends of  
20 bay rafters having connected to them plates from which beads project, the beads lying in respective channels of a ridge casting which is fastened to one end of the ridge beam.

10. A conservatory according to claim 9 in which a screw passes through the ridge casting and internal and external finials are  
25 secured by nuts on to its opposite ends.

11. A conservatory according to any preceding claim in which the single composite beam or one of the composite beams is an eave beam comprising several eave beam bases, each of which is a channel member open at the top, and several eave beam tops secured  
30 to the eave beam bases and each also being a channel member open at the top.

12. A conservatory according to claim 11 in which each eave beam top has projecting outwardly from one side, at its top, an arcuate portion and projecting inwardly from the opposite side, at its  
35 top, a flange, there being rafter support members each having arcuate portions which engage the arcuate portion and flange of the eave beam top to permit the angle of inclination of a rafter

supported by the rafter support member to be altered.

5 13. A conservatory according to any preceding claim including rafters which are hollow extrusions each formed with internal sockets to receive fixing screws and with an external upper groove to receive a screw to secure a pressure plate which presses on a roof glazing unit.

14. A conservatory according to claim 13 in which the upper and lower sides of each rafter are in the form of an inverted V.

10 15. A conservatory according to claim 1, with or without the features specified in claim 12, in which the upper ends of the rafters are connected to wing beams which are pivotally supported on wall brackets secured to a wall, to give a lean-to roof construction in which the inclination of the roof may be selected.

15 16. A conservatory according to claim 1 with a ridged roof having a ridge beam with arcuate portions projecting laterally in opposite directions from its upper part engaging with arcuate portions at the tops of two wing beams which lie on opposite sides of the ridge beam and support the upper ends of two rafters, the wing beams having pivotal connections at their bottom with the  
20 bottom of the ridge beam, whereby the inclination of the rafters may be selected.

17. A conservatory according to claim 16 having a cover member extending over the ridge beam and the wing beams and over the upper ends of adjacent roof glazing sections.

25 18. A conservatory according to claim 17 having a decorative ridging with a base lying in a socket at the top of the cover member.

30 19. A conservatory according to claim 1 having a valley in its roof, where there is a valley beam having an arcuate base which co-operates with beams on opposite sides thereof, the beams supporting rafters the inclination of which can be selected on account of the base of the valley beam being arcuate.

35 20. A conservatory according to any preceding claim having a roof light with an extruded roof light surround to which is pivotally connected a glazed roof light.

21. A conservatory according to claim 1 and having features substantially as hereinbefore described with reference to Figures 1

to 3 or any one of the subsequent Figures of the accompanying drawings.

22. A conservatory substantially in accordance with any example hereinbefore described with reference to the accompanying

5 drawings.

Amendments to the claims have been filed as follows :

CLAIMS:

- 12 -

1. A conservatory having at least one substantially horizontal composite beam extending all round it and comprising a number of straight beam sections inclined to one another and connected  
5 end-to-end, each two adjacent sections of the or each composite beam being connected together by a connecting member having a portion inserted in the end of one section and another portion inserted in the end of the other section, glazing units being provided above and below each composite beam, each composite beam also supporting  
10 rafters which in turn support inclined glazing units.

4. A conservatory roof according to any preceding claim in which screws fasten said sections to said portions.

**Patents Act 1977**  
**Examiner's report to the Comptroller under**  
**Sect. 17 (The Search Report)**

- 13 -

Application number

9121134.2

**Relevant Technical fields**

(i) UK Cl (Edition J ) E1D

(ii) Int Cl (Edition 4 ) E04B, E04H

**Databases (see over)**

(i) UK Patent Office

(ii)

Search Examiner

J D CANTRELL

Date of Search

17 DECEMBER 1991

Documents considered relevant following a search in respect of claims

1-22

Category (see over)	Identity of document and relevant passages	Relevant to claim(s)
X	GB 2241275 A HOMESTYLE	1, 2
X	GB 2223772 A FLUX	1, 2
X	GB 2218127 A SCHOLES	1, 2
X	GB 2212183 A UNIVERSAL	1, 2
X	GB 2135707 GUEST	1, 2
X	GB 1215133 JUGGINS	1

Category	Identity of document and relevant passages	Relevant to claim(s)

#### Categories of documents

**X:** Document indicating lack of novelty or of inventive step.

**Y:** Document indicating lack of inventive step if combined with one or more other documents of the same category.

**A:** Document indicating technological background and/or state of the art.

**P:** Document published on or after the declared priority date but before the filing date of the present application.

**E:** Patent document published on or after, but with priority date earlier than, the filing date of the present application.

**&:** Member of the same patent family, corresponding document.

**Databases:** The UK Patent Office database comprises classified collections of GB, EP, WO and US patent specifications as outlined periodically in the Official Journal (Patents). The on-line databases considered for search are also listed periodically in the Official Journal (Patents).